REMARKS

Claims 1, 3-6, 11, 13, 14, 16-19, 24, 26, 28-31, 36, and 38-43 are all the claims presently pending in the application. Claims 2, 7-10, 12, 15, 20-23, 25, 27, 32-35, and 37 are canceled, with claims 10, 23, and 35 being newly canceled. Claims 41-43 are added, based on the description at lines 18-22 of page 11 for claim 41, line 17 of page 13 through line 2 of page 14 for claim 42, and line 6 of page 15 through line 16 of page 17 for claim 43. Various claims have been amended.

Applicants also note that, notwithstanding any claim amendments herein or later during prosecution, Applicants' intent is to encompass equivalents of all claim elements.

Claims 1, 10, 11, 13, and 38-40 stand rejected under U.S.C. § 101 as allegedly directed to non-statutory subject matter. Although Applicants respectfully disagree, independent claim 1 has been amended in a manner believed to better conform with the recent holding in *Biliski*. Accordingly, the Examiner is respectfully requested to reconsider and withdraw this rejection.

Claims 1, 14, and 26 stand rejected under U.S.C. § 112, first paragraph, as allegedly failing the written description requirement and claim 40 stands rejected under U.S.C. § 112, second paragraph, as allegedly indefinite. Although Applicants respectfully disagree, it is believed that the above claim amendments appropriately address the Examiner's concerns and respectfully request that the Examiner reconsider and withdraw this rejection.

Claims 1, 3-6, 13, 14, 16-19, 26, 28, and 29-31 stand rejected either under 35 U.S.C. § 102(b) as anticipated by "PetroSPIRE: A multi-modal content-based retrieval system for petroleum applications" by Bergman et al. Claim 38 stands rejected either as anticipated by Bergman, or alternatively, as rejected under 35 U.S.C. §103(a) as unpatentable over the Bergman, further in view of "Comparing Texture Feature Sets for Retrieving Core Images in Petroleum Application" by Li et al. Claims 10, 11, 23, 24, 35, 36, 39, and 40 stand rejected under 35 U.S.C. § 103(a) as unpatentable over Bergman/Li, further in view of "A Framework for Mining Sequence Database at Multiple Abstraction Levels" by Yu.

These rejections are respectfully traversed in the following discussion.

I. THE CLAIMED INVENTION

An exemplary embodiment of the claimed invention, as defined by, for example, independent claim 1, is directed to a method for storing information for one or more semantic objects derived from raw data. A semantic object extracted from the raw data and classified to be the semantic object is received from a memory, the received semantic object having one or more attributes. The following is generated using a processor on a computer: a summary of attributes of the semantic object, by calculating one or more statistics of one or more of the one or more attributes of the received semantic obect; a confidence level of the received semantic object that quantifies a degree of certainty that the received semantic object has been correctly classified and/or labeled; and a compact representation of raw data of the received semantic object. The compact representation comprises a multiple segment polyline. Also generated is indexing information for one or more of the summary of attributes and the compact representation of the semantic object. The semantic object, along with its associated summary of attributes, confidence level, compact representation, and indexing information is stored in a semantic object database associated with a database storing the raw data.

Conventionally geological seismic survey data has been visualized to assist geologists in tasks, such as for constructing three dimensional reservoir models. This data may be used to directly create images that may be viewed. These images may be annotated and saved. However, the amount of this seismic survey data is very large and it is very difficult to search and analyze the data in order to identify seismic regions that have geological characteristics which are interesting to geologists. Such enormous amounts of data make it very difficult for a geologist to identify features in the geology that is being visualized.

Additionally, the amount of data that is collected has so far outpaced the ability for conventional systems to store the data.

In stark contrast, the present invention provides a semantic object from geological seismic survey data and then summarizes, indexes, and stores attributes of the semantic object. In this manner, the geological seismic survey data may be analyzed much more efficiently and easily.

II. THE PRIOR ART REJECTIONS

A. The Bergman et al. reference

Regarding the rejection of claims 1, 3-6, 13, 14, 16-19, 26, and 28-31, the Examiner alleges that the Bergman et al. reference teaches the claimed invention, and, relative to claim 38, that Bergman renders this claim obvious if further modified by Li. Moreover, the Examiner alleges that Bergman/Li, when further modified by Yu, renders obvious claims 10, 11, 23, 24, 35, 36, 39, and 40.

Applicants again submit, however, that there are elements of the claimed invention which are neither taught nor suggested by Bergman or any of the other references currently of record, since Bergman has not yet evolved into the mechanism defined by even the independent claims.

Indeed, primary reference relates to the entirely different problem of generating a query for purpose of searching a database such as a petroleum well-bore data (see lines 34-35 of page 449). The rejections of record are due to the Examiner's improper attempts to reconstruct the claimed invention based on hindsight and taking words out-of-context from Bergman.

More specifically, as clearly stated in Bergman in lines 23-25 of page 450: "*Often a geologist wishes to identify a set of lithologies which, when they occur together and in particular order, will characterize a geologic feature, e.g., a river delta is often characterized by a sand sequence coarsening in the upward direction, abruptly capped by shale.*"

As then described beginning at line 39 of page 450: "*This application allows the geologist to identify stratigraphic intervals based on example strata extracted from FMI images, as well as limiting the search by specifying constraints on the accompanying single channel data. For example, when analyzing shale one would restrict attention to those regions with a gamma ray value greater than 50, while sandstone would have a value less than 50.*

The user interface of PetroSPIRE consists of two portions: a data browser and a query builder.... The query builder (Section 5.2) consists of a drag-and-drop interface, known as DanDE (short for "Drag-and-drop English"), which provides for syntax-driven query construction and supports the inclusion of multimedia data types, such as images. Queries are constructed by dropping subphrases selected from menus, into query phrase templates, with automatic enforcement of syntax by the interface. Query phrases may be wholly or partially

reused.

We will demonstrate the capabilities of the PetroSPIRE system by means of an example, and then describe the enabling technologies.

4. EXAMPLE SCENARIO

A typical PetroSPIRE scenario involves defining simple strata types, combining them into more complex composite types, and then searching for these semantic entities within the set of desired data."

Thus, Bergman is not at all related to the claimed invention, since its description relates to the development of a query that will then be used to search the database. In contrast, the claimed invention clearly requires that the semantic objects be pre-extracted and retrieved from memory, so that the additional data described in the independent claims are then generated from these semantic objects.

The Examiner's evaluation is based upon taking out-of-context the terminology and description provided in Bergman for the generation of these query entities, which is an entirely different concept from starting with pre-extracted semantic objects and generating additional information related to each of these semantic objects and storing the additional information along with the semantic objects in a database. As explained in lines 19-21 of page 9, semantic objects "*... are models that represent entities in the modeled space, rather than quantized metrics of some attribute over space.*"

Not even Bergman itself supports the Examiner's position in the rejection of record, since primary reference Bergman itself describes extraction of semantic objects in lines 22-31 of page 457:

"*Semantic object extraction (as part of data ingest) has not been incorporated into the current scenario. Since the SPIRE framework supports object pre-extraction, however, we will describe this facility here. Incorporating this into the PetroSPIRE application, would be very straightforward, and we anticipate doing so in the near future. Semantic content not discribed in the metadata that has general applicability, and that can be reliably inferred from the data, can be extracted and indexed at ingestion time. Images can be partitioned into regions of similar content, using a suite of automatic classification algorithms. For the PetroSPIRE scenario, the*

set of object definitions created by a domain expert can be considered to constitute a classifier. This set of definitions, can be used to pre-extact semantic objects allowing rapid retrieval of these objects at query time. Note that a great deal of power is obtained by providing multiple abstraction levels. At run-time the user can efficiently retrieve pre-defined/pre-extracted objects, or define new object types based on images or other parameter features."

At most, the above-recited description merely states that pre-extraction of semantic objects could be achieved. Therefore, primary reference Bergman clearly fails to demonstrate the first limitation of the independent claim related to the retrieval of pre-extracted semantic objects, let alone generating the additional information described in the independent claims.

The "vectors" relied upon by the Examiner in the rejection of record is clearly describe in lines 43-51 on page 457 as related to the sliding windows of fixed size used to extract features, which, again, is a different concept from the semantic objects described two paragraphs previous in Bergman. All of the terms relied upon in the rejection of record are taken out-of-context from Bergman, since all of these terms are related to Bergman's method of generating a query to be used for searching a database, an entirely different concept from starting with pre-extracted semantic objects and generating additional data for these semantic objects that can then be used for search data.

Hence, turning to the clear language of the claims, in Bergman there is no teaching or suggestion of: " ... receiving, from a memory, a semantic object extracted from said raw data and classified to comprise said semantic object, said received semantic object having one or more attributes;

generating, using a processor on a computer:

a summary of attributes of said semantic object by calculating one or more statistics of one or more of said one or more attributes of said received semantic object;

a confidence level of said received semantic object that quantifies a degree of certainty that said received semantic object has been correctly classified and/or labeled; and

a compact representation of raw data of said received semantic object, said compact representation comprising a multiple segment polyline;

generating indexing information for one or more of the summary of attributes and the

compact representation of said semantic object; and

storing the semantic object along with its associated summary of attributes, confidence level, compact representation, and indexing information in a semantic object database associated with a database storing said raw data", as required by independent claim 1. The remaining independent claims have similar wording.

Moreover, the rejection of record is replete with allegations of being "equivalent to" various aspects of the claimed invention. Applicants respectfully submit that, since Bergman is dedicated to describing the generation of an initial query structure rather than the generation of additional data for pre-extracted semantic objects, Bergman's descriptions inherently fail to be "equivalent to" these aspects of the claimed invention, as alleged by the Examiner.

Therefore, the Bergman et al. reference does not teach or suggest each and every element of the claimed invention and the Examiner is respectfully requested to withdraw this rejection of claims 1, 3-6, 11, 13, 14, 16-19, 24, 26, 28-31, 36, and 38-43.

B. The Bergman et al. reference in view of the Li et al. reference

Regarding the rejection of claim 38, the Examiner alleges that Li would have been combined with the Bergman to form the claimed invention. Applicants submit, however, that these references would not have been combined and, even if combined, the combination would not teach or suggest each and every element of the claimed invention, since secondary reference Li fails to overcome the fundamental deficiency identified above that Bergman fails to even incorporate the feature summarizing and indexing semantic objects.

Therefore, the Examiner is respectfully requested to withdraw the rejection of claim 38.

C. **The Bergman et al. reference in view of the Yu et al. reference**

Regarding the rejection of claims 10, 11, 23, 24, 35, 36, 39, and 40, the Examiner alleges that Yu would have been combined with the Bergman to form the claimed invention. Applicants submit, however, that these references would not have been combined and, even if combined, the combination would not teach or suggest each and every element of the claimed invention, since secondary reference Yu fails to overcome the fundamental deficiency identified above that Bergman fails to even incorporate the feature of summarizing and indexing semantic objects.

Therefore, the Examiner is respectfully requested to withdraw the rejection of claims 10,

11, 23, 24, 35, 36, 39, and 40.

III. FORMAL MATTERS AND CONCLUSION

In view of the foregoing amendments and remarks, Applicants respectfully submit that claims 1, 3-6, 11, 13, 14, 16-19, 24, 26, 28-31, 36, and 38-43, all the claims presently pending in the Application, are patentably distinct over the prior art of record and are in condition for allowance. The Examiner is respectfully requested to pass the above application to issue at the earliest possible time.

Should the Examiner find the Application to be other than in condition for allowance, the Examiner is requested to contact the undersigned at the local telephone number listed below to discuss any other changes deemed necessary in a telephonic or personal interview.

The Commissioner is hereby authorized to charge any deficiency in fees or to credit any overpayment in fees to Attorney's Deposit Account No. 50-0510.

Respectfully Submitted,

Frederick E. Cooperrider
Registration No. 36,769

McGinn Intellectual Property Law Group, PLLC
8321 Old Courthouse Rd., Suite 200
Vienna, Virginia 22182
(703) 761-4100
Customer No. 21254

CERTIFICATION OF TRANSMISSION

I certify that I transmitted via EFS this Amendment under 37 CFR §1.111 to Examiner H. Pham on September 21, 2009.

Frederick E. Cooperrider
Reg. No. 36,769